

Importation of Leaves and Stems of peas, *Pisum sativum* from Mexico into the United States

Qualitative, Pathway-Initiated Pest Risk Assessment

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A. Introduction

This pest risk assessment was prepared by the Animal and Plant Health Inspection Service (APHIS) of the U.S. Department of Agriculture (USDA) to examine plant pest risks associated with the importation into the United States of **fresh leaves and stems of peas (*Pisum sativum*) grown in Mexico**. This is a qualitative pest risk assessment, that is, estimates of risk are expressed in qualitative terms such as high or low rather than numerical terms such as probabilities or frequencies. The details of methodology and rating criteria can be found in: *Pathway-Initiated Pest Risk Assessment: Guidelines for Qualitative Assessments, version 4.0* (USDA, 1995); available from the individual named in the proposed regulations, or on our web site at www.aphis.usda.gov/ppq/bats/bant.

International plant protection organizations, *e.g.*, North American Plant Protection Organization (NAPPO) and International Plant Protection Convention (IPPC) of the United Nations Food and Agriculture Organization (FAO), provide guidance for conducting pest risk analyses. The methods used to initiate, conduct, and report this plant pest risk assessment are consistent with guidelines provided by NAPPO, IPPC and FAO. Our use of biological and phytosanitary terms, *e.g.*, introduction, quarantine pest, conforms with the *NAPPO Compendium of Phytosanitary Terms* (Hopper, 1996) and the *Definitions and Abbreviations* (Introduction Section) in *International Standards for Phytosanitary Measures, Section 1—Import Regulations: Guidelines for Pest Risk Analysis* (FAO 1996).

Pest risk assessment is one component of an overall pest risk analysis. The *Guidelines for Pest Risk Analysis* provided by FAO (1996) describe three stages in pest risk analysis. This document satisfies the requirements of FAO Stages 1 (initiation) and 2 (risk assessment).

B. Risk Assessment

1. Initiating Event: Proposed Action

This pest risk assessment is commodity-based, and therefore "pathway-initiated"; the assessment is in response to a request for USDA authorization to allow importation of a particular commodity presenting a potential plant pest risk. In this case, the importation of **fresh leaves and stems of peas (*Pisum sativum*) grown in Mexico** is a potential pathway for introduction of plant pests. Regulatory authority for the importation of fruits and vegetables from foreign sources into the U.S. is found in 7 CFR §319.56 .

2. Assessment of Weediness Potential of Peas, *Pisum sativum*

The results of the weediness screening for *Pisum sativum* (Table 1) did not prompt a pest-initiated risk assessment.

Table 1: Process for Determining Weediness Potential of Commodity													
Species:	Garden Pea (<i>Pisum sativum</i> L.) (Fabaceae)												
Phase 1:	Garden peas are widely cultivated in the United States.												
Phase 2:	Is the species listed in: <table><tr><td><u>NO</u></td><td><i>Geographical Atlas of World Weeds</i> (Holm <i>et al.</i>, 1979)</td></tr><tr><td><u>NO</u></td><td><i>World's Worst Weeds</i> (Holm <i>et al.</i>, 1977)</td></tr><tr><td><u>NO</u></td><td><i>Report of the Technical Committee to Evaluate Noxious Weeds; Exotic Weeds for Federal Noxious Weed Act</i> (Gunn and Ritchie, 1982)</td></tr><tr><td><u>NO</u></td><td><i>Economically Important Foreign Weeds</i> (Reed, 1977)</td></tr><tr><td><u>NO</u></td><td>Weed Science Society of America list (WSSA, 1989)</td></tr><tr><td><u>NO</u></td><td>Is there any literature reference indicating weediness (<i>e.g.</i>, <i>AGRICOLA</i>, <i>CAB</i>, <i>Biological Abstracts</i>, <i>AGRIS</i>; search on "species name" combined with "weed").</td></tr></table>	<u>NO</u>	<i>Geographical Atlas of World Weeds</i> (Holm <i>et al.</i> , 1979)	<u>NO</u>	<i>World's Worst Weeds</i> (Holm <i>et al.</i> , 1977)	<u>NO</u>	<i>Report of the Technical Committee to Evaluate Noxious Weeds; Exotic Weeds for Federal Noxious Weed Act</i> (Gunn and Ritchie, 1982)	<u>NO</u>	<i>Economically Important Foreign Weeds</i> (Reed, 1977)	<u>NO</u>	Weed Science Society of America list (WSSA, 1989)	<u>NO</u>	Is there any literature reference indicating weediness (<i>e.g.</i> , <i>AGRICOLA</i> , <i>CAB</i> , <i>Biological Abstracts</i> , <i>AGRIS</i> ; search on "species name" combined with "weed").
<u>NO</u>	<i>Geographical Atlas of World Weeds</i> (Holm <i>et al.</i> , 1979)												
<u>NO</u>	<i>World's Worst Weeds</i> (Holm <i>et al.</i> , 1977)												
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<u>NO</u>	Weed Science Society of America list (WSSA, 1989)												
<u>NO</u>	Is there any literature reference indicating weediness (<i>e.g.</i> , <i>AGRICOLA</i> , <i>CAB</i> , <i>Biological Abstracts</i> , <i>AGRIS</i> ; search on "species name" combined with "weed").												
Phase 3: Conclusion:	This species was not reported as a weed in any of the available literature and is grown throughout the United States, commercially and for home use.												

3. Previous Risk Assessments and Current Status

Decision history for *Pisum sativum*

- 1923 - Mexico: Approved for entry at Nogales. (Probably pods)
- 1924 - Mexico: Approved for entry at South Pacific Ports. (Probably pods)
- 1927 - Mexico: Approved for entry at Southern Ports. (Probably pods)
- 1988 - Mexico: Recommendation Number 88-17-56 dated June 8, 1988 recommended fumigation as a condition of entry if either of the lepidopterist pests, *Epinotia aporema* or *Maruca testulalis*, were found during inspection.
- 1997 - Mexico: Non-propagative Manual lists Pea (pod or shelled) as enterable from All ports subject to treatment if *Cydia fabivora*, *Epinotia aporema*, or *Maruca testualis* are found during inspection.

4. Pest List: Pests Associated with *Pisum sativum*

The pest list in Table 2, was developed after a review of the information sources listed in USDA (1995). The list summarizes information on the distribution of each pest, pest-commodity association, and regulatory history.

Table 2: Pest List - <i>Pisum</i> spp.			
Scientific Name, Classification	Distribution¹	Comments²	References
Pathogens			
<i>Aphanomyces euteiches</i> Drechs. (Oomycetes: Saprolegniales)	MX,US	a,o	Alvarez, 1967; Farr <i>et al.</i> , 1989
<i>Ascochyta pisi</i> Lib. (Fungi Imperfecti: Coelomycetes)	MX,US	o,Z _{ei}	CMI, 1985; Hagedorn, 1984; McGuire and Crandall, 1967
<i>Botryotinia</i> (= <i>Sclerotinia</i>) <i>fuckeliana</i> (de Bary) Whetzel (Discomycetes: Helotiales)	MX,US	o,Z _{ei}	Ellis and Waller, 1974; Farr <i>et al.</i> , 1989
<i>Cladosporium herbarum</i> (Pers.:Fr.) Link (Fungi Imperfecti: Hyphomycetes)	MX,US	o,Z _{ei}	Wellman, 1977
<i>Cladosporium</i> sp. (Fungi Imperfecti: Hyphomycetes)	MX	Z _{ei}	USDA, 1997
<i>Colletotrichum gloeosporioides</i> (Penz.) Penz. & Sacc. in Penz. (Fungi Imperfecti: Coelomycetes)	MX,US	o,Z _{ei}	Farr <i>et al.</i> , 1989; McGuire and Crandall, 1967
<i>Erysiphe pisi</i> DC (Pyrenomycetes: Erysiphales)	Worldwide	o,Z _{ei}	Kapoor, 1967
<i>Erysiphe polygoni</i> D.C. (Pyrenomycetes: Erysiphales)	MX,US	o,Z _{ei}	Alvarez, 1967; Farr <i>et al.</i> , 1989
<i>Fusarium oxysporum</i> Schlechtend.:Fr. f.sp. <i>pisi</i> (J.C. Hall) W. C. Snyder and Hanna (Fungi Imperfecti: Hyphomycetes)	Worldwide	o	Brayford, D. 1996.; Farr <i>et al.</i> , 1989
<i>Mycosphaerella pinodes</i> (Berk. & Blox.) Vesterg. (Loculoascomycetes: Dothideales) Anamorph: <i>Ascochyta pinodes</i> L.K. Jones	MX,US	o,Z _{ei}	CMI, 1979; Hagedorn, 1984
<i>Peronospora pisi</i> Syd. (Oomycetes: Peronosporales)	MX,US	o,Z _{ei}	Farr <i>et al.</i> , 1989; Leon-Gallegos, 1978
<i>Phoma</i> (= <i>Ascochyta</i>) <i>pinodella</i> (L.K. Jones) Morgan-Jones & K.B. Burch (Fungi Imperfecti: Coelomycetes)	MX,US	o,Z _{ei}	Farr <i>et al.</i> , 1989; Punithalingam and Gibson, 1969
<i>Pythium aphanidermatum</i> (Edson) Fitzp. (Oomycetes: Peronosporales)	MX,US	o	CMI, 1978c; Farr <i>et al.</i> , 1989
<i>Pythium ultimum</i> Trow (Oomycetes: Peronosporales)	MX,US	o,Z _{ei}	CMI, 1978b; Farr <i>et al.</i> , 1989
<i>Rhizotonia</i> sp. (Mycelia Sterila: Agonomycetes)	MX	c,o	Alvarez, 1967

<i>Thanatephorus cucumeris</i> (A.B. Frank) Donk (Basidiomycetes: Tulasnellales)	MX,US	o,z _u	Farr <i>et al.</i> , 1989; Mordue, 1974
<i>Uromyces fabae</i> (Grev.) Fuckel (Basidiomycetes: Uredinales)	MX,US	o	CMI, 1990; Farr <i>et al.</i> , 1989
Bacteria			
<i>Agrobacterium tumefaciens</i> (Smith & Townsend) Conn	MX,US	c,o	Bradbury, 1986
<i>Erwinia carotovora</i> subsp. <i>carotovora</i> (Jones) Bergey	MX,US	c,o	Bradbury, 1986
<i>Pseudomonas solanacearum</i> (Smith) Smith	MX,US	c,o	Bradbury, 1986
<i>Pseudomonas syringae</i> pv. <i>phaseolicola</i> (Burkholder) Young, Dye & Wilkie	MX,US	c,o	Bradbury, 1986
<i>Pseudomonas syringae</i> pv. <i>pisi</i> (Sackett) Young, Dye & Wilkie	MX,US	c,o	Bradbury, 1986
<i>Pseudomonas syringae</i> pv. <i>tabaci</i> (Wolf & Foster) Young, Dye & Wilkie	MX,US	o	Bradbury, 1986
<i>Xanthomonas campestris</i> pv. <i>phaseoli</i> (Smith) Dye	MX,US	c,m,o	Bradbury, 1986
Viruses			
Beet western yellows luteovirus	MX,US	o	Brunt <i>et al.</i> , 1990; Brunt <i>et al.</i> , 1996
Cucumber mosaic cucumovirus	MX,US	o	Brunt <i>et al.</i> , 1990; Brunt <i>et al.</i> , 1996
Lettuce mosaic potyvirus	MX,US	o	Brunt <i>et al.</i> , 1990; Brunt <i>et al.</i> , 1996; CMI, 1969
Pea mosaic virus	Worldwide	o	Brunt <i>et al.</i> , 1990
Tomato spotted wilt tospovirus	MX,US	o	Brunt <i>et al.</i> , 1990; Brunt <i>et al.</i> , 1996; CMI, 1978a; EPPO, 1995
Arthropods			
<i>Achyra rantalis</i> Gueene (Lepidoptera: Pyralidae)	MX,US	c,o	Zhang, 1995
<i>Acyrtosiphon</i> (= <i>Macrosiphum</i>) <i>pisum</i> (Harris) (Homoptera: Aphididae)	MX,US	o,y,z _u	CIE, 1982; Hagedorn, 1984; McGuire and Crandall, 1967
Agromyzidae, species of. (Diptera)	MX	x,z _u	USDA, 1997
<i>Agrotis ipsilon</i> (Hfn.) (Lepidoptera: Noctuidae)	MX,US	o	CIE, 1969; Kranz <i>et al.</i> , 1977
<i>Agrotis</i> sp. (Lepidoptera: Noctuidae)	MX	a	McGuire and Crandall, 1967

<i>Anomis</i> sp.(Lepidoptera: Noctuidae)	MX	(pods)	USDA, 1997
<i>Aphis fabae</i> Scopolii (Homoptera: Aphididae)	MX,US	o,y,z,	Blackman and Eastop, 1984
<i>Aphis</i> spp. (Homoptera: Aphididae)	MX	z,	McGuire and Crandall, 1967
<i>Apion</i> sp.(Coleoptera: Curculionidae)	MX	(pods)	USDA, 1997
<i>Aulacorthum solani</i> (Kaltenbach) (Homoptera: Aphididae)	MX,US	o,y,z,	Blackman and Eastop, 1984
<i>Bemisia tabaci</i> (Genn.) (Homoptera: Aleyrodidae)	MX,US	o	CIE, 1986a; Kranz <i>et al.</i> , 1977
<i>Blapstinus</i> sp. (Coleoptera: Tenebrionidae)	MX	(pods)	USDA, 1997
<i>Blissus</i> sp. (Heteroptera: Lygaeidae)	MX	(pods)	USDA, 1997
<i>Copitarsia consueta</i> Walker (Lepidoptera: Noctuidae)	MX	z,	McGuire and Crandall, 1967
<i>Copitarsia</i> sp. (Lepidoptera: Noctuidae)	MX	(pods)	USDA, 1997
Crambidae, species of. (Lepidoptera)	MX	(pods)	USDA, 1997
Delphacidae, species of. (Homoptera)	MX	(pods)	USDA, 1997
<i>Epilachna varivestis</i> Muls. (Coleoptera: Coccinellidae)	MX,US	o	CIE, 1954; Kranz <i>et al.</i> , 1977
<i>Epinotia aporema</i> (Walsingham) (Lepidoptera: Tortricidae)(= <i>E. opposita</i>)	MX,US(TX ₂)	(pods)	Oakley, 1953; USDA, 1997; Williamson, 1943; Zhang, 1994
<i>Etiella zinckenella</i> (Treit.) (Lepidoptera: Pyralidae)	MX,US	o	CIE, 1974a; McGuire and Crandall, 1967; Zhang, 1994
<i>Euschistus servus</i> (Say) (Hemiptera: Pentatomidae)	MX,US	o	Metcalf and Metcalf, 1993; Sailer, 1972
<i>Frankliniella occidentalis</i> (Pergande) (Thysanoptera: Thripidae)	MX,US	o	EPPO, 1995; Guerra-Sobrevilla, 1989; IIE, 1993
<i>Frankliniella</i> sp. (Thysanoptera: Thripidae)	MX	(pods & leaves)	USDA, 1997
<i>Fundella argentina</i> Dyar (Lepidoptera: Pyralidae)	MX,US	c,o	Zhang, 1995
<i>Gnathotrichus</i> sp. (Coleoptera: Scolytidae)	MX	(pods)	USDA, 1997
<i>Helicoverpa zea</i> Boddie (Lepidoptera: Noctuidae)	MX,US	o	CIE, 1993; Kranz <i>et al.</i> , 1977
<i>Lipaphis erysimi</i> (Kalt.) (Homoptera: Aphididae)	MX,US	o	CIE, 1965; Kranz <i>et al.</i> , 1977

<i>Liriomyza huidobrensis</i> (Blanchard) (= <i>L. langei</i> Frick (Diptera: Agromyzidae)	MX,US(CA,HI, TX,UT,WA)	h ₄ ,z ₄	EPPO, 1992; Gary <i>et al.</i> , 1986; Heinz and Chaney, 1995; Malais <i>et al.</i> , 1992; McGuire and Crandall, 1967; Spencer 1973; Spencer and Steyskal, 1986
<i>Liriomyza sativae</i> Blanchard (Diptera: Agromyzidae)	MX,US	o,z ₄	CIE, 1986b, Spencer, 1973 and 1990
<i>Liriomyza trifolii</i> (Burgess) (Diptera: Agromyzidae)	MX,US	o,z ₄	CIE, 1984; Spencer, 1973 and 1990
Lycaenidae, species of. (Lepidoptera)	MX	x,(pods)	USDA, 1997
<i>Macrosiphum euphorbia</i> (Thomas) (Homoptera: Aphididae)	MX,US	o,y,z ₄	Blackman and Eastop, 1984
<i>Maruca testulalis</i> (Geyer) (Lepidoptera: Pyralidae)	MX,US(GU, HI,PR,TX ₃)	z ₄	CIE, 1975; Ferguson, 1983; Muniappan and Bjork, 1984; Williamson, 1943; Zhang, 1994
Miridae, species of. (Heteroptera)	MX	(pods)	USDA, 1997
<i>Myodocha</i> sp. (Heteroptera: Lygaeidae)	MX	(pods)	USDA, 1997
<i>Myzus persicae</i> (Sulzer) (Homoptera: Aphididae)	MX,US	o,y,z ₄	Blackman and Eastop, 1984
Noctuidae, species of. (Lepidoptera)	MX	(pods)	USDA, 1997
<i>Nysius</i> sp. (Heteroptera: Lygaeidae)	MX	x,(pods)	USDA, 1997
<i>Nezara viridula</i> (L.) (Hemiptera: Pentatomidae)	MX,US	o	CIE, 1970; Kranz <i>et al.</i> , 1977
Pentatomidae, species of. (Heteroptera)	MX	(pods)	USDA, 1997
<i>Prodenia</i> spp. (Lepidoptera: Noctuidae)	MX	z ₄	McGuire and Crandall, 1967
<i>Pseudopamera</i> sp. (Heteroptera: Lygaeidae)	MX	(pods)	USDA, 1997
Pyralidae, species of. (Lepidoptera)	MX	(pods)	USDA, 1997
<i>Spilosoma</i> (= <i>Diacrisia</i>) <i>virginica</i> Fabricius (Lepidoptera: Tortricidae)	MX,US	o,z ₄	McGuire and Crandall, 1967; Zhang, 1994
<i>Spodoptera frugiperda</i> (Smith) (Lepidoptera: Noctuidae)	MX,US	o,z ₄	CIE, 1985; McGuire and Crandall, 1967
<i>Spodoptera ornithogalli</i> Gueene (Lepidoptera: Noctuidae)	MX,US	c,o	Zhang, 1995
<i>Tetranychus yusti</i> McGregor (Acari: Tetranychidae)	MX,US	o	Jeppson <i>et al.</i> , 1975
Thripidae, species of. (Thysanoptera)	MX	x,(pods & leaves)	USDA, 1997

Thysanoptera, species of.	MX	x,(pods & leaves)	USDA, 1997
<i>Trichoplusia ni</i> (Hb.) (Lepidoptera: Noctuidae)	MX,US	o	CIE, 1974b, Kranz <i>et al.</i> , 1977

¹ Distribution legend: MX = Mexico; US = United States; CA, California; GU = Guam; HI = Hawaii; PR = Puerto Rico; TX = Texas; UT = Utah; WA = Washington

² Comments:

- a = Pest mainly associated with a plant part other than the commodity.
- c = Listed in USDA's non-reportable dictionary as non-actionable.
- h = Quarantine pest: pest has limited distribution in the U.S. and is under official control as follows: (1) pest listed by name in USDA's pest dictionary, official quarantine action may be taken on this pest when intercepted on this commodity and, (2) pest is a program pest.
- m = The pest occurs within the PRA area and has been reported to attack the specified host species in other geographic regions; but has not been reported to attack the specified host species in the PRA area.
- o = Organism does not meet the geographic or regulatory definition of a quarantine pest.
- x = Multiple interception records exist.
- y = Pest is a vector of plant pathogens.
- z_e = External pest: is known to attack or infest *Pisum* spp. and it would be reasonable to expect the pest may remain with the commodity during processing and shipping.
- z_i = Internal pest: is known to attack or infest *Pisum* spp. and it would be reasonable to expect the pest may remain with the commodity during processing and shipping.

³ *Epinotia aporema* and *Maruca testulalis* have not been detected in Texas since 1943 and have not been reported as established there.

⁴ *Liriomyza huidobrensis* is an actionable pest if commodity is destined to Florida.

5. List of Quarantine Pests

The list of quarantine pests for commercial shipments of fresh leaves and stems of peas from Mexico is provided in Table 3. Should any of these pests be intercepted on commercial (or any other) shipments of *Pisum sativum*, quarantine action may be taken.

Table 3: Quarantine Pests:	
Pathogens	<i>Cladosporium</i> sp.
Arthropods	<i>Agromyzidae</i> , species of <i>Agrotis</i> sp. <i>Anomis</i> sp. <i>Aphis</i> sp. <i>Apion</i> sp. <i>Blapstinus</i> sp. <i>Blissus</i> sp. <i>Copitarsia consueta</i> <i>Copitarsia</i> sp. Crambidae, species of Delphacidae, species of <i>Epinotia aporema</i> <i>Frankliniella</i> spp. <i>Gnathotrichus</i> sp. <i>Liriomyza huidobrensis</i> Lycaenidae, species of <i>Maruca testulalis</i> Miridae, species of <i>Myodocha</i> sp. Noctuidae, species of <i>Nysius</i> sp. Pentatomidae, species of <i>Prodenia</i> sp. <i>Pseudopamera</i> sp. Pyralidae, species of Thripidae, species of Thysanoptera, species of

6. Quarantine Pests Likely to Follow Pathway (*i.e.*, Quarantine Pests Selected for Further Analysis)

Only those quarantine pests that can reasonably be expected to follow the pathway, *i. e.*, be included in commercial shipments of *Pisum sativum*, were analyzed in detail (USDA, 1995). Only quarantine pests listed in Table 4 were selected for further analysis and subjected to steps 7-9 below.

Table 4: Quarantine Pest Selected for Further Analysis:

Arthropods	<i>Copitarsia consueta</i> <i>Epinotia aporema</i> <i>Liriomyza huidobrensis</i> <i>Maruca testulalis</i>
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Other plant pests in this Assessment, not chosen for further scrutiny, may be potentially detrimental to the agricultural production systems of the United States; however, there were a variety of reasons for not subjecting them to further analysis. For example, they are associated mainly with plant parts other than the commodity; they may be associated with the commodity (however, it was not considered reasonable to expect these pests to remain with the commodity during processing); they have been intercepted as biological contaminants of these commodities during inspections by Plant Protection and Quarantine Officers; but, would not be expected to be present with every shipment. In addition, the biological hazard of organisms identified only to the generic level are not assessed due to the lack of adequate biological/taxonomic information. This lack of biological information on any given insect or pathogen should not be equated with low risk. By necessity, pest risk assessments focus on those organisms for which biological information is available. By developing detailed assessments for known pests that inhabit a variety of niches on the parent species, *i.e.* on the surface of or within the bark/wood, on the foliage, etc., effective mitigation measures can be developed to eliminate the known organism and any similar unknown ones that inhabit the same niches.

7. Economic Importance: Consequences of Introduction

The consequences of introduction were considered for each quarantine pest selected for further analysis. For qualitative, pathway-initiated pest risk assessments, these risks are estimated by rating each pest with respect to five risk elements (USDA, 1995). Table 5 shows the risk ratings for these risk elements.

Table 5: Risk Rating: Consequences of Introduction						
Pest	Climate/ Host	Host Range	Dispersal	Economic	Environ- mental	Risk Rating
<i>Copitarsia consueta</i>	medium	high	medium	medium	high*	high
<i>Epinotia aporema</i>	medium	medium	medium	medium	high**	high
<i>Liriomyza huidobrensis</i>	high	high	medium	medium	high***	high
<i>Maruca testulalis</i>	high	high	medium	medium	high****	high

*This pest is known to attack members of the plant genus, *Solanum*. In the United States, *Solanum drymophilum*, *S. incompletum*, and *S. sandwicense* are Federally listed endangered species.

**This pest is known to attack members of the plant genera, *Trifolium*, *Vicia*, and *Vigna*. In the United States, *Trifolium stoloniferum*, *Vicia menziesii* and *Vigna o-wahuensis* are Federally listed endangered species.

***This pest is known to attack members of the plant genera, *Solanum* and *Vicia*. In the United States, *Solanum drymophilum*, *S. incompletum*, *S. sandwicense*, and *Vicia menziesii* are Federally listed endangered species.

****This pest is known to attack members of the plant genera, *Canavalia*, *Crotalaria*, *Sesbania*, *Vicia*, and *Vigna*. In the United States, *Canavalia molokaiensis*, *Crotalaria avonensis*, *Sesbania tomentosa*, *Vicia menziesii* and *Vigna o-wahuensis* are Federally listed endangered species.

We believe it would be reasonable to assume that these pests may attack these endangered plants. Because of existing legislation regarding endangered plants, we automatically gave these pests a risk rating of “high” for Consequence of Introduction.

8. Likelihood of Introduction

Each pest is rated with respect to introduction potential, *i.e.*, entry and establishment. Two separate components are considered. First, the amount of commodity likely to be imported is estimated. More imports lead to greater risk; therefore, the risk rating for the quantity of commodity is the same for all quarantine pests considered. Second, five biological features, *i.e.* (risk elements) concerning the pest and its interactions with the commodity are considered. The resulting risk ratings are specific to each pest. The cumulative risk rating for introduction was considered to be an indicator of the likelihood that a particular pest would be introduced (USDA, 1995). Table 6 shows our ratings for these risk elements.

Table 6: Risk Rating: Likelihood of Introduction							
Pest	Quantity of commodity imported annually	Likelihood survive postharvest treatment	Likelihood survive shipment	Likelihood not detected at port of entry	Likelihood moved to suitable habitat	Likelihood find suitable host	Risk rating
<i>Copitarsia consueta</i>	low	medium	high	low	medium	medium	medium
<i>Epinotia aporema</i>	low	high	high	low	medium	medium	medium
<i>Liriomyza huidobrensis</i>	low	high	high	low	medium	medium	medium
<i>Maruca testulalis</i>	low	high	high	low	medium	medium	medium

9. Conclusion: Pest Risk Potential and Phytosanitary Measures

The measure of pest risk potential combines the risk ratings for consequences and likelihood of introduction (USDA, 1995). The estimated pest risk potential for each quarantine pest selected for further analysis for the importation of *Pisum sativum* is provided in Table 7.

Table 7: Pest Risk Potential, Quarantine Pests, Mexico Peas	
Pest	Pest risk potential
<i>Copitarsia consueta</i>	high
<i>Epinotia aporema</i>	high
<i>Liriomyza huidobrensis</i>	high
<i>Maruca testulalis</i>	high

Plant pests with a high Pest Risk Potential may require specific phytosanitary measures. The choice of appropriate sanitary and phytosanitary measures to mitigate risk is undertaken as part of Risk Management and is not addressed, *per se*, in this document.

PPQ has over 250 plant pest interceptions from leaves, fruits, and seeds of peas from other areas; however, virtually all external pests listed could be detected by inspection. Some of these same pests occur in Mexico in addition to other quarantine pests and have been intercepted as hitchhikers with other commodities. Should any of these pests be intercepted on commercial (or any other) shipments of *Pisum sativum*, quarantine action may be taken.

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